

CLAIMS

1. A conductive lid adapted to function as a heat sink for an integrated circuit, said conductive lid comprising:
 - a recessed portion adapted to receive a die of said integrated circuit;
 - a foot portion having a surface adapted to be coupled to a substrate of said integrated circuit; and
 - a through-hole located in said foot portion, said through hole being adapted to receive an adhesive to secure said conductive lid to said substrate of said integrated circuit.
2. The conductive lid of claim 1 wherein said through-hole comprises a straight through-hole.
3. The conductive lid of claim 1 wherein said through-hole comprises a tapered through-hole.
4. The conductive lid of claim 3 wherein said through-hole comprises a multi-diameter through-hole.
5. The conductive lid of claim 3 wherein said through-hole comprises a first cylindrical portion and a second cylindrical portion.
6. The conductive lid of claim 1 wherein said through-hole is formed by injection molding.
7. The conductive lid of claim 1 wherein said through-hole is formed by drilling.
8. The conductive lid of claim 1 wherein said foot portion extends around said recessed portion.
9. The conductive lid of claim 8 further comprising a plurality of through-holes positioned in said foot portion.

10. The conductive lid of claim 9 wherein said plurality of holes are symmetrically spaced around said foot portion.

11. An integrated circuit having a heat sink, said integrated circuit comprising:

a substrate;

a die positioned on said substrate; and

a conductive lid positioned over said die and coupled to said substrate, said conductive lid comprising at least one through-hole.

12. The integrated circuit of claim 11 wherein said through-hole comprises a straight through-hole.

13. The integrated circuit of claim 11 wherein said through-hole comprises a tapered through-hole.

14. The integrated circuit of claim 11 wherein said through-hole comprises a conical through-hole.

15. The integrated circuit of claim 11 wherein said through-hole comprises a first cylindrical portion and a second cylindrical portion, said first cylindrical portion having a diameter which is different from said second cylindrical portion.

16. The integrated circuit of claim 11 further comprising an adhesive material coupling said conductive lid to said substrate.

17. The integrated circuit of claim 16 wherein said adhesive material comprises a thermally conductive epoxy.

18. The integrated circuit of claim 16 wherein said adhesive material extends into said through-hole.

19. The integrated circuit of claim 11 further comprising a thermal grease positioned between said die and said conductive lid.

20. The integrated circuit of claim 11 further comprising underfill positioned between said substrate and said conductive lid.

21. A method of forming a conductive lid for an integrated circuit, said method comprising the steps of:
forming a recessed portion for receiving a die of said integrated circuit;
creating a foot portion around said recessed portion; and
providing a plurality of through-holes in said foot portion.

22. The method of claim 21 wherein said step of providing a plurality of through-holes comprises drilling said plurality of through-holes.

23. The method of claim 22 wherein said step of drilling said plurality of through-holes comprises drilling straight through-holes.

24. The method of claim 22 wherein said step of drilling said plurality of through-holes comprises drilling tapered through-holes.

25. The method of claim 22 wherein said step of drilling said plurality of through-holes comprises drilling multi-diameter through-holes.

26. The method of claim 21 wherein said steps of forming, creating and providing are performed by injection molding.

27. A method of securing a conductive lid to an integrated circuit, said method comprising the steps of:

providing a conductive lid having a through-hole;
applying an adhesive material to a substrate to
said integrated circuit; and
positioning said conductive lid on said substrate such
that said adhesive material extends into said hole.

28. The method of claim 27 wherein said step of
providing a conductive lid having a through-hole comprises
providing a conductive lid having a plurality of tapered
through-holes.

29. The method of claim 27 wherein said step of
providing a conductive lid comprises providing a foot
portion extending around a recess of said conductive lid,
said foot portion having a plurality of through-holes for
receiving said adhesive material.

30. The method of claim 27 further comprising a step
of providing an underfill between said substrate and a die.

31. The method of claim 30 further comprising a step
of providing a thermal grease between said die and said
conductive lid.

32. A method of using a conductive lid on an
integrated circuit, said method comprising the steps of:
providing a substrate for receiving a die;
applying an adhesive material to said substrate;
securing a conductive lid having a through-hole to
said substrate using said adhesive material, said adhesive
material extending into said through-hole; and
conducting heat from said die by way of said
conductive lid.

33. The method of claim 32 wherein said step of
applying an adhesive material comprises applying a
conductive adhesive material.

34. The method of claim 33 wherein said step of conducting heat from said die comprises conducting heat by way of said conductive adhesive material.

35. The method of claim 32 further comprising a step of providing a thermal grease between said die and said conductive lid.

36. The method of claim 35 wherein said step of conducting heat from said die further comprises conducting heat by way of said thermal grease.